

Case Study

Trees provide fodder and boost production

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TRUST**

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Already delivering commercial and environmental advantages, a Shropshire-based farmer hopes his trees will also offer nutritional and medicinal benefits to his organic dairy herd



Tim Downes is an organic dairy farmer based in Longor, who has benefited from the incorporation of trees on his land for some time. His dairy business has 250 spring calving cows and he sells his milk through the Organic Milk Suppliers Co-Operative

(OMSCO). Initially, Tim introduced trees on to his land to aid with shelter, soil conditions and water management, but now believes there are significant benefits to be had in terms of trees providing nutritional and medicinal fodder for his herd.

Initial land management

With several waterways running through the land, pollution, loss of nutrients due to runoff, water infiltration and stock control have been a high priority on the farm, with Tim planting several trees alongside the water courses. Tim commented, "Trees help to keep vital nutrients in the field, rather than it running off into the surrounding waterways. At the same time, they also act as a valuable barrier and keep animals away, reducing the potential for disease spread." As well as this, the trees have also helped to stabilise the banks of the stream, brooks and rivers running through the farm, reducing bankside erosion, nutrient loss and the potential for flooding.

Increasing shelter

In addition to the measures taken to improve water management, Tim has also used trees to provide much-needed shelter across his land. Around 20 years ago, he planted cherry and oak trees in awkward field corners which could not be farmed or accessed by machinery, with the farm also comprising numerous in-field and hedgerow trees, as well as some small clusters of woodland. The shelter provided helps to increase soil temperatures in early spring and late autumn, extending the grass growing season, as well as helping to mitigate wind speeds and the impact of hot, dry summers on pastures by improving crop water efficiency. As with most dairy systems, access to high quality grazing is essential, as higher nutritional values can lead to improvements in milk production. Speaking of the planting, Tim said, "Shelter from the trees now means that water is retained on the grazed land, meaning the cows now have access to more nutritious grazing because there is higher growth in the field."

“Farmers will look at tree planting from a profit-making angle, as farms need to make commercial gains to justify the initial expense. We’ve been able to demonstrate the commercial benefits on our farm, and now we’re increasingly looking at the health benefits of trees to our herd and how this links into improved milk production.”

Tim Downes, dairy farmer, Shropshire



The commercial and health cases for tree planting on dairy farms.

Trees can:

- Provide cost effective shade and shelter, boosting grass growth and livestock performance.
- Improve the drainage of fields by improving water infiltration rates thus reducing damage from poaching and the incidence of waterlogged pasture.
- Improve water quality by trapping agricultural pollutants before they enter water courses and prevent cows drinking from water courses which could harbour diseases.
- Provide health and nutritional benefits. Benefits from browsing native trees will come via directly influencing productivity through protein content, through secondary compounds such as tannins acting as anti-parasitics, and improved trace element provision.
- Enable the farm to become energy self-sufficient, which in turn will provide long-term financial savings through the provision of wood fuel from the farm for the biomass boiler.



Planting trees for browsing

Focused on the importance of fodder based nutrition for his herd Tim was eager to understand the potential nutritional benefits available from trees enabling him to expand his grazing area to another plane. With help from the Woodland Trust, student Tim Saunders researched the nutritional and medicinal value of trees in a dairy system and designed the field trials as part of his Masters in Research (MRes) at Harper Adams University. The nutritional browsing trial was planted in February 2014 and the medicinal one a year later. Tree choice for both trials was determined by selecting palatable species using evidence both anecdotally and from published work, with trees needing to be native, productive, resilient, quick growing and which did not pose any risk of being poisonous. As a result, four species were chosen for the nutritional trial – sycamore, hornbeam, small leaf lime and elm – with a total of 72 trees planted in three rows 8m apart within a 2.5 hectare field. The medicinal trial is planted in the home paddock and consists of 35 crack willows and 35 white willows planted in two rows 25m apart.

Once established, it is hoped the trees will provide an alternative source of dietary protein and improve the efficiency of the nitrogen utilisation by shifting where proteins are digested from the rumen to the small intestine. Some trees, such as willow, store much higher quantities of trace elements in their foliage than pasture species. Trace elements such as zinc and copper are small but important components of a healthy diet for dairy cattle. For example the effects of deficiencies in zinc include low milk production and reduced reproductive capacity.

Within the medicinal trial, Tim intends to graze cows suffering with mastitis, lameness or fertility problems, as well as those which have had stomach upsets or difficulty calving. For instance, cows with mastitis or sore feet could benefit from the anti-inflammatory properties evident in the salicylic acid of the willow trees. There is also growing evidence that the condensed tannins found in tree fodder

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act as anti-parasitics through their protein binding action. Studies have shown that ruminants dosed with condensed tannins, both in tree fodder and as an extract, can have a significantly reduced load of nematodes within a month.

Speaking of the research, Tim says, “We have a lot to learn about managing fodder trees, but we want to work out how much the cows are eating and if there is a preference for certain tree species. The trial will analyse the nutritional content of the tree fodder, record milk volume and quality and overall cow health, but we hope that, ultimately, the animals will have access to more feed value, become less stressed and be productive for longer.”

Additional commercial benefits

While Tim is committed to the browsing trials, it is a long-term project that will take a while to provide qualitative results. In the meantime however, Tim is already utilising the commercial benefits offered by the trees and hedgerows in his land, which has contributed significantly to lowering his overall farm-running costs.

Through effective hedgerow maintenance and the clearing of fallen trees, Tim is able to utilise the wood on his land to heat his office, farm house and flat through the biomass systems that he installed. Over time, this is something he hopes to continue to do by instigating a woodland management plan across his farm, with an aspiration to become entirely self-sufficient in the long-term. Speaking of the benefits, Tim said, “The money that I’ve saved from not having to purchase heating oil has already covered the cost of the boiler installation. In 20-30 years’ time, newly planted trees will provide harvestable timber for us to continue heating the farm buildings ourselves.”

